

Methods And System For Bio-Intelligence From Over-The-Counter Pharmaceutical Sales



Xiaohui Zhang
Scientific Technologies Corp.
4400 E Broadway Blvd., Suite 705
Tucson, AZ 85711, USA

Abstract

An analysis and unusual event detection method is presented herein that was developed systematically for bio-intelligence in the area of syndromic surveillance using over-the-counter (OTC) pharmaceutical sales data. First, a measurement scheme was defined. It bases on historical sales records and a set of derived seasonally varying reference lines. The relative deviation (RD) of the current daily medicine sales data from the reference lines, the n-days cumulation of the relative deviations, and the daily change of the relative deviations are calculated. Second, a dynamic system model for categorized public health status was developed and described by a set of state variables and state transitions. State transitions are determined by a rule system. The combination of the quantitative measurements listed above establishes the supporting set for the rule system. Therefore, the dynamic change of public health status is systematically modeled over time and space by rule-system-driven state transitions. Certain system states represent unusual events and can be fully described through this methodology.

Reference

Topics in Mathematical Systems Theory
Kalman, R.E., Falb, P.L., Arbib, M.A. (1969), McGraw-Hill Book Company

Linear System Theory, The State Space Approach
Zadeh, Lofti A., Desoer, Charles A. (1963), McGraw-Hill Book Company